

full-thickness iris hole and allows aqueous humor to flow from the posterior to the anterior chamber of the eye. This relieves the pupillary block mechanism of narrow-angle glaucoma. After laser iridotomy the intraocular pressure is elevated temporarily from the dispersion of pigment into the anterior chamber. This elevation is usually mild and can be controlled medically. Some iris colors increase the difficulty of the procedure, particularly very light blue and very dark brown irides. Occasionally a full-thickness hole cannot be produced, requiring a repeat laser attempt or a conventional surgical iridectomy. Lens burn, mild iritis and corneal burns have been noted.

Argon laser trabeculoplasty and argon laser iridotomy are acceptable modes of surgical therapy, and have been valuable adjuncts in the clinical management of glaucoma.

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## Corneal Preservation

THE COLLECTION, evaluation and preservation of viable corneal tissue for purposes of transplantation are the major functions of a modern eye bank. Prospective donors are carefully screened by eye bank personnel for transmissible diseases or disqualifying ocular disease that would contraindicate their use as graft material. Tissue is then removed from a donor by enucleation of the whole globe or by excision of the cornea and a rim of sclera from the globe in situ within six hours after death.

Corneal tissue is evaluated by morphologic examination of the cornea with a slit-lamp biomicroscope or by using more recently developed specular microscopy for examination and counting of corneal endothelial cells.

Tissue preservation is necessary to allow for preparation of patients and transport of tissue and is accomplished by one of three methods: (1) moist-chamber storage of the whole globe, (2) intermediate cold storage in tissue culture medium and (3) long-term preservation in organ culture systems.

Corneas preserved as part of an intact globe in cold, moist-chamber storage must be used within 24 to 48 hours after death (short term). Storage of an excised cornea in modified tissue culture medium (McCarey-Kaufman [MK] medium) at 4°C extends tissue viability to 96 hours postmortem (intermediate term). More recently developed preservation of the delicate corneal endothelium in organ culture at 37°C has extended endothelial viability in storage to several weeks (long term). Most eye banks currently use intermediate-term preservation (MK medium).

Meticulous care to details of aseptic technique and preservation of endothelial integrity have enabled eye banks to provide excellent tissue to transplant surgeons and their patients. Medical standards for the qualifica-

tions of eye bank personnel, screening of appropriate donors, techniques of tissue handling and methods of corneal preservation have been determined by the Eye Bank Association of America.

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## Extended-Wear Lenses and Corneal Infections

EXTENDED-WEAR soft contact lenses have been approved for use in both myopic and hyperopic patients for several years. While some of the initial concerns involved the ability of the cornea to metabolically tolerate these lenses over longer periods, this has not proved to be of major consequence. Rather, more significant problems have occurred in two other areas—lens maintenance and infections. Some patients must remove their lenses to eliminate films and deposits. Unfortunately this is especially true in older patients who would benefit most from limited handling. While this problem provides a certain inconvenience, it is of no serious medical consequence.

Infection, however, may be the cause of permanent visual loss. It has been shown that merely having an extended-wear lens in place does not seem to change the normal bacterial flora of the eye. Nevertheless, corneal ulcers can and do occur, resulting in corneal scarring. Whereas these infections are uncommon, they occur when least expected and without warning. One would think that decreased handling would result in reduced incidences of infection, but this is apparently not the case. They are probably related to oxygen compromise. Continual administration of antibiotic drops is not justified, although hygiene is important to maintain. It is vital, however, that a red eye in a patient using extended-wear lenses be reported to that patient's ophthalmologist immediately.

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## YAG Laser Posterior Capsulotomy

CATARACT OPERATIONS and intraocular lens implantation have changed dramatically in the past decade. Extracapsular surgical treatment in which the posterior capsule of the lens is preserved is popular because of the possible benefits of improved lens fixation and reduced risk of retinal detachment and cystoid macular edema. In 30% to 50% of cases, the posterior capsule opacifies in the years following a cataract operation. Until recently treatment of opacified capsules was limited to invasive procedures to open the membrane.

Working simultaneously and independently, Aron-

Rosa of Paris and Fankhauser of Bern, Switzerland, developed short-pulse high-power neodymium-YAG (yttrium-aluminum-garnet) lasers for use in ophthalmology. These lasers use extremely high-power densities that cause optical breakdown, leading to a mechanical separation of tissue. These instruments were quickly adapted to the problem of an opaque posterior capsule and are now widely used for noninvasive laser procedures to open these membranes.

Laser operations for secondary capsulotomy have several advantages over invasive procedures. The laser procedure is totally noninvasive, eliminating the risk of infection. The opening in a capsule can be designed more precisely than a surgical capsulotomy. The treatment is painless and is done on an outpatient basis, reducing cost and patient discomfort. Complications have included a temporary increase in intraocular pressure after capsulotomy and damage to lens implants. Lens implant damage has had only minor effects on visual acuity and can be minimized with proper treatment technique and lens implant design. The increased intraocular pressure problem is currently being investigated.

Other uses of the YAG laser include iridotomy and vitreous strand cutting, which are promising applications but have not achieved the widespread acceptance of posterior capsulotomy. Posterior capsulotomy remains under the control of the Food and Drug Administration, with the YAG laser being an investigational device.

Confusion persists among lay persons and medical professionals concerning "laser cataract surgery." The YAG laser can open the opaque posterior capsule after a cataract operation, but no laser treatment can remove a cataract.

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## Macular Function Testing

IN PATIENTS whose eyes have such dense cataracts that the retina cannot be seen, the functional state of the macula must be evaluated so as to provide the most accurate prognosis concerning postoperative visual acuity. Instruments recently developed to predict more accurately the visual outcome following a surgical procedure include the blue-field entoptoscope, interferometers that use either incandescent or laser light and the potential acuity meter.

The blue-field entoptoscope is a light projector into which a patient peers. The light is deep blue and of varying intensity. A patient with a normal macula will report briskly moving particles in a fairly regular pattern, evenly distributed over the entire field.

Interferometric fringe patterns are also used. They are generated from an incandescent light source or a helium-neon laser. Interference fringe patterns are produced that are projected on the retina as a series of parallel lines of varying coarseness. The finer the perceived fringe, the better the predicted visual acuity.

The potential acuity meter is the most recent arrival of these new instruments. This is an elegant Snellen's vision chart projector, which is attached to the slit lamp. By aiming it at the clearest portion of the cataract and asking the patient to search around for the clearest view, a formal vision chart can be clearly projected onto the macula.

In very dense cataracts the images to be seen with these instruments often cannot be perceived even with a normal macula, and their predictive value is much less accurate. In moderately dense cataracts a good preoperative measurement with any of the above instruments offers a greater assurance of good postoperative visual acuity.

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